waves on measurements of distortion-product otoacoustic emissions. J Acoust Soc Am. 98, 3200-3214.

[0413] Whitehead, M. L., Stagner, B. B., McCoy, M. J., Lonsbury-Martin, B. L., Martin, G. K., 1995b. Dependence of distortion-product otoacoustic emissions on primary levels in normal and impaired ears. II. Asymmetry in L1, L2 space. J Acoust Soc Am. 97, 2359-2377.

[0414] Whitehead, M. L., McCoy, M. J., Lonsbury-Martin, B. L., Martin, G. K., 1995c. Dependence of distortion-product otoacoustic emissions on primary levels in normal and impaired ears. I. Effects of decreasing L2 below Ll. J Acoust Soc Am. 97, 2346-2358.

[0415] Wang X, Michaelis E K., 2010. Selective neuronal vulnerability to oxidative stress in the brain. Front Aging Neurosci., 2:12.

[0416] Yamashita, D., Miller, J. M., Jiang, H. Y., Minami, S. B., Schacht, J., 2004. AIF and EndoG in noise-induced hearing loss. Neuroreport 15, 2719-2722.

[0417] All of the compositions and methods disclosed and claimed herein can be made and executed without undue experimentation in light of the present disclosure. While the compositions and methods of this invention have been described in terms of preferred embodiments, it will be apparent to those of skill in the art that variations may be applied to the compositions and methods and in the steps or in the sequence of steps of the method described herein without departing from the spirit and scope of the invention. More specifically, the described embodiments are to be considered in all respects only as illustrative and not restrictive. All similar substitutes and modifications apparent to those skilled in the art are deemed to be within the spirit and scope of the invention as defined by the appended claims.

[0418] All patents, patent applications, and publications mentioned in the specification are indicative of the levels of those of ordinary skill in the art to which the invention pertains. All patents, patent applications, and publications, including those to which priority or another benefit is claimed, are herein incorporated by reference to the same extent as if each individual publication was specifically and individually indicated to be incorporated by reference.

[0419] The invention illustratively described herein suitably may be practiced in the absence of any element(s) not specifically disclosed herein. Thus, for example, in each instance herein any of the terms "comprising", "consisting essentially of", and "consisting of" may be replaced with either of the other two terms. The terms and expressions which have been employed are used as terms of description and not of limitation, and there is no intention that use of such terms and expressions imply excluding any equivalents of the features shown and described in whole or in part thereof, but it is recognized that various modifications are possible within the scope of the invention claimed. Thus, it should be understood that although the present invention has been specifically disclosed by preferred embodiments and optional features, modification and variation of the concepts herein disclosed may be resorted to by those skilled in the art, and that such modifications and variations are considered to be within the scope of this invention as defined by the appended claims.

What is claimed is:

1. A method of treating an auditory impairment in a subject, the method comprising administering to said subject an effective amount of a purified carboxyl alkyl ester (CAE), thereby treating the auditory impairment in the subject.

2. The method of claim **1**, wherein the CAE was derived from Uncaria tomentosa.

3. The method of claim **2**, wherein the CAE was derived from Uncaria tomentosa bark, leaves, or root.

4. The method of claim **1**, wherein the CAE was purified from an aqueous extract.

5. The method of claim **4**, wherein the aqueous extract was derived from Uncaria tomentosa.

6. The method of claim **4**, wherein the aqueous extract was derived from Uncaria tomentosa bark, leaves, or root.

7. The method of claim **1**, wherein the CAE is are selected from the group consisting of 3,4-O-dicaffeoylquinic acid, 3,5-O-dicaffeoylquinic acid, 1,3-O-dicaffeoylquinic acid, 4,5-O-dicaffeoylquinic acid, 1,5-O-dicaffeoylquinic acid, 3-O-feruloylquinic acid, 4-O-feruloylquinic acid, 5-O-feruloylquinic acid, 1-O-caffeoylquinic acid, 3-O-caffeoylquinic acid, 4-O-caffeoylquinic acid, 5-O-caffeoylquinic acid, (1S, 3R, 4R, 5R)-3-[3-(3,4-dihydroxyphenyl)-3R-hydroxypropanoyl]-1,4,5-trihydroxycyclohexanecarboxylic acid, (1S, 3R, 4R, 5R)-3-[3-(3,4 dihydroxyphenyl)-3 S-hydroxypropanoyl]-1,4,5-trihydroxycyclohexane carboxylic acid, (1S, 3R, 4R, 5R)-5-[3-(3,4-dihydroxyphenyl)-3R-hydroxypropanoyl]-1, 3,4-trihydroxycyclohexanecarboxylic acid, (1S, 3R, 4R, 5R)-5-[3-(3,4-dihydroxyphenyl)-3 S-hydroxypropanoyl]-1,3,4-trihydroxycyclohexanecarboxylic acid, (1S, 3R, 4R, 5R)-4-[3-(3,4-dihydroxyphenyl)-3R-hydroxypropanoyl]-1, 3,5-trihydroxycyclohexanecarboxylic acid, (1S, 3R, 4R, 5R)-4-[3-(3,4-dihydroxyphenyl)-3S-hydroxypropanoyl]-1,3,5-trihydroxycyclohexanecarboxylic acid, cis-5-O-caffeoylquinic acid, 3-O-caffeoylquinic acid lactone, and 3-O-caffeoyl-4-O-feruloylquinic acid, or a pharmaceutically acceptable salt thereof.

8. The method of claim **1**, wherein the composition is formulated for administration selected from the group consisting of auricular, oral, parenteral, intraperitoneal, local, buccal, nasal, and topical administration.

9. The method of claim **1**, wherein said composition is in the form of a liquid, tablet, or capsule.

10. The method of claim **1**, wherein the auditory impairment is hearing loss or deafness.

11. The method of claim **1**, wherein the auditory impairment was effected by an insult that can damage the auditory system.

12. A method of treating an auditory impairment in a subject, the method comprising administering to said subject an effective amount of a composition comprising an aqueous extract derived from Uncaria tomentosa leaves or root, thereby treating the auditory impairment in the subject.

13. The method of claim **12**, wherein the aqueous extract contains a CAE.

14. The method of claim **13**, wherein the CAE is are selected from the group consisting of 3,4-O-dicaffeoylquinic acid, 3,5-O-dicaffeoylquinic acid, 1,3-O-dicaffeoylquinic acid, 4,5-O-dicaffeoylquinic acid, 1,5-O-dicaffeoylquinic acid, 3-O-feruloylquinic acid, 4-O-feruloylquinic acid, 5-O-feruloylquinic acid, 1-O-caffeoylquinic acid, 3-O-caffeoylquinic acid, 4-O-caffeoylquinic acid, 5-O-caffeoylquinic acid, (1S, 3R, 4R, 5R)-3-[3-(3,4-dihydroxyphenyl)-3R-hydroxypropanoyl]-1,4,5-trihydroxycyclohexanecarboxylic acid, (1S, 3R, 4R, 5R)-3-[3-(3,4 dihydroxyphenyl)-3S-hydroxypropanoyl]-1,4,5-trihydroxycyclohexanecarboxylic acid, (1S, 3R, 4R, 5R)-5-[3-(3,4-dihydroxyphenyl)-3R-hydroxypropanoyl]-1,3,4-trihydroxycyclohexanecarboxylic acid, (1S, 3R, 4R, 5R)-5-